NON-PUBLIC?: N
ACCESSION #: 9309030222
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Surry Power Station, Unit 2 PAGE: 1 OF 5

DOCKET NUMBER: 05000281

TITLE: Unit 2 Automatic Reactor Trip Due to Low Steam Generator Water Level Coincident With Steam/Feedwater Flow Mismatch Resulting From Spurious Closure of "A" MFRV
EVENT DATE: 08/03/93 LER #: 93-003-00 REPORT DATE: 08/27/93

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: N POWER LEVEL: 97%

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: M. R. Kansler, Station Manager TELEPHONE: (804) 357-3184

COMPONENT FAILURE DESCRIPTION:
CAUSE: B SYSTEM: AA COMPONENT: IL MANUFACTURER: M035
B SB RV W120
B JB FCV W120
REPORTABLE NPRDS: N
Y
Y

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

At 2005 hours on August 3, 1993, with Unit 1 at 100% power and Unit 2 at 97% power, Unit 2 experienced an automatic reactor trip. The trip occurred when the "A" Main Feedwater Regulating Valve (MFRV) unexpectedly closed, causing a feed flow/steam flow mismatch coincident with a low water level in the "A" steam generator. Reactor Protection System functions actuated as designed, and post-trip response was satisfactory. The reactor was placed in a safe, hot shutdown condition, and the health and safety of the public were not affected. The cause of the closure of the MFRV was traced to an erratic power supply in the manual/automatic control station. This report is required by 10CFR50.73(a)(2)(iv).

END OF ABSTRACT

Figure "Required Number Of Digits/Characters For Each Block" omitted.

1.0 DESCRIPTION OF THE EVENT

On August 3, 1993, at 2005 hours, with Unit 2 at 97% power, the Unit experienced an automatic reactor trip because of a steam flow/feed flow mismatch coincident with a low water level in the "A" steam generator, 2-RC-E-1A (EIIS-AB, SG). The transient occurred when the "A" Main Feedwater Regulating Valve (MFRV), 2-FW-FCV-2478 (EIIS-JB, FCV) unexpectedly closed. The turbine (EIIS-TA) and main generator (EIIS-TB) tripped as designed. The Anticipated Transient Without Scram Mitigation System Actuation Circuitry (AMSAC) also actuated as designed. The Auxiliary Feedwater Pumps, 2-FW-P-2, 2-FW-P-3A, and 2-FW-P-3B (EIIS-BA, P) automatically started on decreasing steam generator level as designed.

Control Room operators responded to the trip in accordance with emergency and other operating procedures. Plant response was as expected except for the following:

o Individual Rod Position Indicator (IRPI) rod bottom light (EIIS-AA, IL) for control rod M-10 was slow in illuminating. (The rod bottom light illuminated at approximately 2055 hours.)

o "C" Steam Generator Power Operated Relief Valve (PORV), 2-MS-RV-201C, (EIIS-SB, RV) indicated "intermediate" at 960 psig (design lift setting is 1035 psig). Subsequent investigation showed that the valve did not lift.

The Nuclear Regulatory Commission was notified in accordance with 10CFR50.72 at 2221 hours. This event is being reported pursuant to 10CFR50.73(a)(2)(iv) as an automatic actuation of the Reactor Protection System (RPS) (EIIS-JC).

2.0 SIGNIFICANT SAFETY CONSEQUENCES AND IMPLICATIONS

Upon receipt of the reactor trip, RPS actuations functioned as designed, and all control rods inserted into the core. The electrical buses transferred properly and off-site power was maintained

throughout the event. The emergency diesel generators remained operable in automatic, but were not required to start. Station operating personnel acted promptly to place the plant in a stable, hot shutdown condition. The shutdown margin of reactivity was calculated and found to be satisfactory. The health and safety of the public were not affected.

3.0 CAUSE OF THE EVENT

The reactor tripped as designed when the "A" Steam Generator experienced a feed flow/steam flow mismatch coincident with a low steam generator water level. The cause of the decrease in feedwater flow and loss of water level was closure of the "A" MFRV. The valve's positioner received an unexpected demand to shut, and efforts on the part of the licensed Control Room Operator to take manual control and open the valve were unsuccessful in reversing the transient. The cause of the closure of the MFRV was traced to an erratic power supply in the manual/automatic control station.

4.0 IMMEDIATE CORRECTIVE ACTION(s)

Operators acted promptly to place the plant in a safe, shutdown condition in accordance with emergency and other operating procedures. The licensed Control Room Operator adjusted the "C" Steam Generator PORV set point to clear the intermediate indication.. The Shift Technical Advisor monitored the safety function status trees to verify that unit conditions were acceptable.

5.0 ADDITIONAL CORRECTIVE ACTION(S)

o IRPI rod bottom light for control rod M-10.
- Problems have been experienced with this indication for several years. The Nuclear Steam Supply System vendor has evaluated the condition and concluded
that its cause is
residual permeability in the control md drive mechanism housing. This phenomenon is caused by a combination of factors, including material composition and the decrease in reactor coolant system temperature following a trip.
- A hot rod drop test conducted subsequent to the reactor trip showed that control rod M-10 was fully operable.

o The "C" Steam Generator PORV control loop was investigated and a number of discrepancies were detected. The pressure

controller and power supply were replaced and the transmitter
was recalibrated.

o "A" Main Feedwater Regulating Valve.
- An extensive troubleshooting effort was conducted in an
attempt to identify the source of the signal which caused
the "A" main were examined:
-- valve controller inputs
-- manual/automatic control station
-- turbine first stage pressure input summator
-- terminal connections on control system modules
-- valve actuator
-- valve positioner
-- electro/pneumatic converter.
- A number of components were replaced, including:
-- flow controller
-- manual/auto control station

During examination of the MFRV manual/automatic control station which had been replaced, it was noted that the - 15 VDC power supply was behaving erratically. A failure of this power supply will cause the controller to fail to zero output and inhibit control responses in automatic or manual. Since a lack of controller response in automatic and manual was observed during the event, the controller was determined to be the cause of the event.

6.0 ACTIONS TO PREVENT RECURRENCE

A Root Cause Evaluation (RCE) was initiated immediately after the reactor trip. Recommendations of the RCE will be evaluated and implemented as appropriate.

7.0 SIMILAR EVENTS

LER S2-86-007 Manual reactor trip due to high steam generator level (metal debris between MFRV plug and valve seat).

LER S2-90-003 Manual reactor trip due to failure of "A" Main Feedwater Regulating Valve (blockage of positioner air supply inlet filter/orifice assembly.)

LER S2-90-004 Manual reactor trip following inadvertent grounding of the "A" Main Feedwater Regulating Valve control signal during testing.

8.0 MANUFACTURER/MODEL NUMBER

IRPI Rod Bottom Light Spang & Co.,
Magnetics Div.
Signal Conditioning
Card, EPC-2NI-13,
Part # E 2786

"C" Steam Generator PORV Westinghouse Hagan
Controller Model 4111080-001

MFRV Manual/Automatic Control Westinghouse Hagan
Station 7100 Series
Control System Model
124 Controller

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10CFR50.73

Virginia Electric and Power Company
Surry Power Station
P. O. Box 315
Surry, Virginia 23883

August 27, 1993

U. S. Nuclear Regulatory Commission Serial No.: 93-538
Document Control Desk SPS:RCB
Washington, D. C. 20555 Docket No.: 50-281
License No.: DPR-37

Dear Sirs:

Pursuant to Surry Power Station Technical Specifications, Virginia Electric and Power Company hereby submits the following Licensee Event Report applicable to Surry Power Station Unit 2.

REPORT NUMBER

50-281/93-003-00

This report has been reviewed by the Station Nuclear Safety and Operating Committee and will be forwarded to the Management Safety Review Committee for its review.

Very truly yours,

M. R. Kansler
Station Manager

Enclosure

cc: Regional Administrator
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

M. W. Branch
NRC Senior Resident Inspector
Surry Power Station

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